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Myomectomy during cesarean section: Evaluation of perioperative results

Sezaryen sırasında miyomektomi: Perioperatif sonuçların değerlendirilmesi

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Abstract

Aim: To compare the perioperative outcomes between patients who underwent myomectomy during cesarean section and those without myomectomy during cesarean section retrospectively.

Materials and Methods: In our study, a total of 187 patients, including 125 patients who underwent myomectomy (case) during cesarean section and 62 patients who had not undergone myomectomy (control) during cesarean section, were included in our clinic between February 2015- October 2019. Basic demographic characteristics of the patients, gestational week at the time of operation, the mean number of myoma and size, locations of myoma, mean differences between hemoglobin and hematocrit levels postoperatively, mean operation time, need for erythrocyte transfusion, and mean hospitalization time were retrospectively evaluated.

Results: The mean diameter of the myoma in the control group is significantly higher than that of the myomectomy group (5.75 ± 3.71 cm and 4.73 ± 3.76 cm, respectively; p:0.0057). The mean operation time was 82.81 ± 28.69 min. and 70.08 ± 17.89 min. in the myomectomy and control groups, respectively (p: 0.003). There was no statistically significant difference between the two groups in the other parameters (Mean Hb, Htc differences postoperatively, mean hospitalization time, etc.).

Conclusion: Our results support that myomectomy performed during the cesarean section does not increase perioperative morbidity and may be useful when it is performed by experienced surgeons. In addition, myomectomy during cesarean section can decrease the need for secondary surgery due to the myoma.

Keywords: Cesarean section, myomectomy, hemorrhage.

Öz

Amaç: *Sezaryen sırasında miyomektomi yapılan (olgu) ve miyomektomi yapılmayan (kontrol) hastalar arasındaki perioperatif sonuçları retrospektif olarak kıyaslamak.*

Gereç ve Yöntem: *Çalışmamıza kliniğimizde Şubat 2015 – Ekim 2019 tarihleri arasındaki sezaryen sırasında miyomektomi yapılan (olgu) 125 hasta ve sezaryen esnasında miyomektomi yapılmayan (kontrol) 62 hasta olmak üzere toplam 187 hasta dahil edildi. Hastaların temel demografik özellikleri, gebelik haftaları, miyom sayı ve ortalama çapları, yerleşim yerleri, postoperatif hemoglobin ve hematokrit değişiklikleri, operasyon süreleri, eritrosit transfüzyon ihtiyaçları ve hastanede kalış süreleri kıyaslanmıştır.*

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***Bulgular**: Her iki gruptaki hastalar karşılaştırıldığında miyomektomi yapılmayan gruptaki hastaların ortalama miyom çapları daha yüksek olarak bulundu (miyomektomi yapılanlarda: 4,73 ±3,76 cm, miyomektomi yapılmayanlarda: 5,75 ±3,71 cm; p:0,0057). Operasyon süresi ise miyomektomi yapılan grupta 82,81 ±28,69 dk. iken miyomektomi yapılmayan grupta 70.08 ±17.89 dk. olarak bulundu (p: 0,003). İki grup arasında diğer parametrelerde (ortalama hemoglobin, hematokrit değişiklikleri, hastanede kalış süresi, vb.) istatistiksel olarak anlamlı fark saptanmadı.*

***Sonuç:** Sezaryen operasyonu sırasında gerçekleştirilen miyomektominin perioperatif morbiditeyi arttırmadığı ve uygun hasta grubunda tecrübeli ekip tarafından yapıldığında hastanın ikincil bir cerrahi operasyona ihtiyacının azaltması açısından faydalı bir uygulama olabileceği gösterilmiştir.*

***Anahtar Sözcükler:** Sezaryen doğum, miyomektomi, hemoraji.*

Introduction

Leiomyoma (myoma, fibroid) is the most common benign tumor in the female genital system. The incidence of the uterine leiomyoma in pregnancy varies according to pregnancy trimester and is between 1.6% and 10.7%. Nowadays, the incidence of uterine leiomyomas increases as the average gestational age gradually increases (1, 2). Therefore, obstetricians are more likely to encounter pregnant women with leiomyoma and related complications. A total of 10–30% of the pregnancies develop some complications related to leiomyomas (3, 4). Although leiomyomas are generally asymptomatic, they may affect pregnancy and delivery according to their location, number, and size. The most common complications of the myoma during pregnancy, include abdominal pain, abortion, preterm labor, premature rupture of membranes, placental adhesion abnormalities, placental retention after delivery, increased operative delivery, and malpresentations (5, 6).

Myomectomies performed during cesarean section (C/S) have some advantages like reducing the risk of exposure to additional surgery and anesthesia, preventing work force loss, and reducing financial costs. While this practice is thought to lead to uterine atony, severe hemorrhage, and postoperative morbidities, recent studies have shown that it is not (7).

The aim of this study is to investigate the difference between perioperative outcomes examining the electronic patient files in patients with myomectomy and without myomectomy during C/S in our clinic retrospectively.

Materials and Methods

Data of 125 patients who underwent myomectomy during C/S and 62 patients who without myomectomy during C/S with various indications between February 2015 and October 2019 at the Department of Obstetrics and Gynecology, Ege University School of Medicine, Izmir, Turkey were retrospectively analyzed. Before the initiation of the current study Institutional review board approval was obtained from the local ethics committee for the study (Approval number: 19-12.1 T/28). Informed consent was obtained from all patients who participated to the study. Pregnant women with placenta accreta, placental abruption, antenatal bleeding, coagulation defects, severe preeclampsia, eclampsia, drug usage such as aspirin, heparin, warfarin, and who underwent additional surgery during C/S were excluded from the study.

Age, Body Mass Index (BMI), gravidity, parity, gestational weeks at the time of C/S, surgical history, number and diameters of myomas, number of myomas detected by the surgeon during C/S, type, size, and localization of myomas were recorded. In addition, preoperative and postoperative hemoglobin (Hb) and hematocrit (Htc) values, whether there were complications, need for blood transfusion, duration of operation (starting the skin incision - closing the skin completely), duration of hospitalization, baby weights, 1-minute and 5-minute APGAR scores and pathological diagnoses of myomectomy materials were examined. The main aim of the current study was to evaluate the effects of myomectomy performed during C/S on intraoperative and early postoperative outcomes. For this purpose, we compared intraoperative blood loss, effects on newborn and complication rates between two groups. Most patients underwent Pfannenstiel incision and uterine lower segment transverse incision during C/S. After the baby and placenta were delivered, a linear incision was made with bipolar cautery on the surface of the myoma for enucleation. After the removal of myomas,

bleeding was prevented by 0-Vicryl sutures and bipolar cautery. Pedunculated myomas were removed by cutting or suturing the pedicle with electrocautery. All patients received preoperative prophylactic intravenous antibiotics (cefazolin sodium, 1000 mg) (Sefazol®, Deva A.S, Istanbul, Turkey). Oxytocin (Synpitan forte®, Deva A.S, Istanbul, Turkey) infusion continued in order to prevent perioperative and postoperative massive bleeding. The operations were performed by experienced surgeons who have well- trained in the management of postpartum hemorrhage.

Statistical Analysis

Statistical Package for the Social Sciences (SPSS) for Windows, version 22 (SPSS Inc., IBM, Chicago, IL, USA) was used for statistical analysis. Descriptive data were expressed as mean ± standard deviation. Student's t-test was used for comparison of quantitative data between two groups and Mann- Whitney U- test was used for comparison of non-normally distributed parameters. A chi-square test was used to compare categorical data. In the analysis of longitudinal data, Brunner Langer analysis was used using nonparametric methods. A p- value < 0.05 was considered as statistically significant.

Results

A total of one hundred and eighty-seven cases were included in this study. One hundred and twenty-five patients underwent myomectomy at the time of C/S and sixty-two patients with fibroids were undergone only C/S. When the mean age, gravidity, parity, week of gestation, previous cesarean history, history of vaginal delivery, BMI, and indications of rates were compared between the myomectomy and control groups, no statistically significant difference was observed. When we look at the perinatal results, no significant difference was found regarding birth weights and APGAR scores at 1- and 5- minutes between the two groups. The mean birth weight of newborns' in the myomectomy and control groups was 2864.92 ± 793 g and 2994.59 ± 856 g, respectively (p: 0.231). The APGAR scores of newborns' in the myomectomy group at 1- and 5- minutes were 7.68 ± 1.24 and 9.00 ± 0.885, respectively (p: 0.092). The APGAR scores of newborns' in the control group at 1- and 5- minutes were 7.90 ± 1.43 and 9.14± 1.122, respectively (p: 0.098). Basic demographic characteristics, cesarean indications, and perinatal outcomes of the cases are demonstrated in (Table-1).

Intramural myoma is the most common type of myomas, including 39 (31.2%) patients in the myomectomy group and 33 (53.2%) patients in the control group. The mean diameter of the myoma in the control group is significantly higher than that of the myomectomy group (5.75 ± 3.71 cm and 4.73 ± 3.76 cm, respectively; p: 0.0057). In patients with multiple myomas, the largest diameter of the myoma was taken into consideration. Most of the myoma was removed from the anterior uterine wall of 83 (66.4%) patients in the myomectomy group and 23 (37.1%) patients in the control group (Figure-1). The average number of fibroids is 1.68 ± 1.38 in the myomectomy group and 1.54 ± 1.15 in the control group (p: 0.688). The number, size, type of location, and types of myomas in both groups are shown in (Table-2).

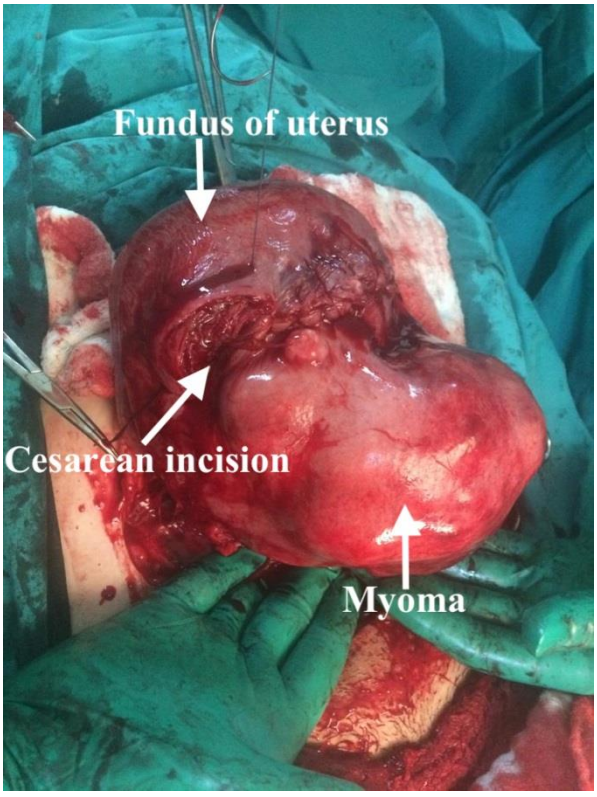

Figure-1. Huge intramural myoma on the anterior uterine wall during C/S.

While preoperative and postoperative mean Hb levels were 12.02 ± 1.33 g/dl and 11.00 ± 1.43 g/dl in the myomectomy group, 12.36 ± 3.56 g / dl and 11.26 ± 2.96 g/dl in the control group, respectively. The preoperative and postoperative mean Htc levels were 35.79 ± 3.40% and 32.69 ± 3.92% in the myomectomy group whereas, 35.54

± 4.82% and 32.94 ± 3.61% in the control group (Figure-2). No statistically significant difference was found between preoperative and postoperative Hb levels in addition to preoperative and postoperative Htc levels between the two groups (p: 0.862 for Hb levels; p: 0.986 for Htc levels). The mean changes in the Hb and Htc levels in myomectomy and control groups were listed in (Table-3).

The mean number of packed erythrocyte transfusion in the myomectomy group and control group was 0.24 ± 0.75 and 0.082 ± 0.45, respectively (p: 0.057). Mean operation time was 82.81 ± 28.69 min. and 70.08 ± 17.89 min. in the myomectomy and control groups, respectively. When the mean operation times were compared, a statistically significant difference was found between the two groups (p:0.003). All patients in the myomectomy group were discharged 82.81 ± 28.69 hours after the operation, while patients in the control group were discharged at 70.08 ± 17.89 hours after the operation (p: 0.154). All these data are listed in (Table-4).

The uterine defects after the myomectomy were completely closed in all patients without any complications. No patients underwent a hysterectomy due to myomectomy. All myomectomy materials' final pathology results were reported as benign. No complication was encountered in any patient during operation and hospitalization.

Table-1. Demographic characteristics of the patients.

	Myomectomy group (n: 125)	**Control group (n:62)**	**p- value**
Age (years), mean ± SD	34.8 ± 4.4	33.5 ± 4.8	0,110
Gravida	2.1 ± 1.6	1.8 ± 1.1	0.381
Parity	0.5 ± 0.8	0.4 ± 0.7	0.535
Gestational week	36.7 ± 2.7	36.8 ± 2.6	0.582
Previous C/S	0.3 ± 0.6	0.3 ± 0.5	0.557
Previous vaginal delivery	0.2 ± 0.6	0.1 ± 0.6	0.154
BMI (kg/m^2), mean ± SD	29.7 ± 4.3	30.1 ± 4.8	0.831
Cesarean indications, n (%)			0.365
-Cephalopelvic disproportion (CPD)	28 (22.4)	13 (21)	
-Fetal distress	28 (22.4)	16 (25.8)	
-Arrested labor	9 (22.4)	2 (3.2)	
-Malpresentation	11 (8.8)	7 (11.3)	
-Previous one C/S with other cause	37 (29.6)	17 (11.3)	
-Myoma	12 (9.6)	7 (11.3)	
Birthweight of newborn (g), mean ± SD	2864.92 ± 793	2994.59 ± 856	0.231
APGAR 1-min., mean ± SD	7.68 ± 1.24	7.90 ± 1.43	0.092
APGAR 5- min., mean ± SD	9.00 ± 0.885	9.14 ± 1.122	0.098

Data are expressed as mean ± standard deviation (continuous variables) or as n (%) dichotomous variables. C/S: Cesarean section; min: minutes; BMI: Body Mass Index; SD: standard deviation

Table-2. Characteristics of the myomas in both groups.

	Myomectomy group (n: 125)	Control group (n: 62)	p-value
Types of the myoma, n (%)			-
-Intramural	39 (31.2)	33 (53.2)	
-Subserosal	70 (56)	27 (43.5)	
-Submucosal	4 (3.2)	2 (3.2)	
-Subserosal+Intramural	12 (9.6)	0 (0)	
Mean diameter of the myoma (cm), mean ± SD	4.73 ± 3.76	5.75 ± 3.71	**0.0057**
Location of the myoma, n (%)			-
-Anterior	83 (66.4)	23 (37.1)	
-Fundal	18 (14.4)	13 (21)	
-Posterior	19 (15.2)	19 (30.6)	
-Right lateral	0 (0)	7 (11)	
-Left lateral	5 (4)	0 (0)	
Number of the myoma, mean ± SD	1.68 ± 1.38	1.54 ± 1.15	0.688

Data are expressed as mean ± standard deviation (continuous variables) or as n (%) dichotomous variables. SD: standard deviation

Table-3. Surgical characteristics.

	Myomectomy group (n: 125)	Control group (n: 62)	p- value
Erythrocyte transfusion (pack), mean ± SD	0.24 ± 0.75	0.082 ± 0.45	0.057
Operation time (min), mean ± SD	82.81 ± 28.69	70.08 ± 17.89	**0.003**
Length of hospital stay (hour), mean ± SD	64.59 ± 26.59	58.04 ± 17.98	0.154
Perioperative complication	0	0	1
Preoperative hemoglobin level (g/dl), mean ± SD	12.02 ± 1.33	12.36 ± 3.56	0.862
Preoperative hematocrit level (%), mean ± SD	35.79 ± 3.40	35.54 ± 4.82	0.986
Postoperative hemoglobin level (g/dl), mean ± SD	11.00 ± 1.43	11.26 ± 2.96	0.862
Postoperative hematocrit level (%), mean ± SD	32.69 ± 3.92	32.94 ± 3.61	0.986

Data are expressed as mean ± standard deviation for continuous variables.

Discussion

Myomectomy is one of the most common surgical operation performed during C/S. Its management during C/S poses a therapeutic challenge among surgeons. Perioperative bleeding due to high vascularity, need for blood product infusion, and its complications, increased postoperative morbidity are common concerns among obstetricians (8). However, it is believed that myomectomy can be a safe and effective procedure in experienced centers in a selected-pregnant woman with myoma. In the current study, we have demonstrated that myomectomy performed at the time of C/S does not increase the risk of hemorrhage, perioperative complication, and duration of hospitalization. We see that the rate of advanced age pregnancy increases day by day due to the place of women in society and their career plans. However, the number of uterine myomas encountered during pregnancy is also expected to increase (9). In the presence of pregnant women with myoma, the

pregnancy follow-up, and the decision on the type or time of delivery may be more specific (10). Most obstetricians do not favor myomectomy during C/S. The possibility of encountering complications such as massive bleeding and hysterectomy are among the reasons for obstetricians to avoid this procedure. Recently, many obstetricians think that when this operation is performed by experienced surgeons, it will be less likely to encounter such complications (11).

Because of hormonal stimulation and abundant blood supply of the uterus, myomas tend to grow during pregnancy and shrink in the postpartum puerperal period (12). The reliability of cesarean myomectomy has been reported in recent studies. It has been shown that it does not increase the risk of intraoperative bleeding and uterine atony compared to the group without myomectomy during C/S according to Tinelli et al. study (13).

This procedure provides advantages such as reduction of blood loss, prevention of birth loss, additional cost, and re-anesthesia exposure by preventing the second operation (14). The myoma uteri can be submucosal, subserosal, cervical, pedicled, or intra-ligamental located. The ones who underwent myomectomy during cesarean are generally those who have a subserosal location, due to the easy diagnosis (15). In our study, we see that the most removed myoma in the case group with a rate of 56% was the subserous typed (70 out of 125 patients). As a myoma location, we found that those located on the anterior face of the uterus were removed more frequently (80 out of 127 patients). Various studies mention that 3-20 cm sized myoma can be removed during C/S (16). In a study conducted by Kwon et al., it was observed that the removal of myomas larger than 5 cm during C/S did not differ in Hb-Htc change, hospital stay, and operation time. They also reported that this procedure could be considered as safe (17). In our study, the average diameter of the myoma which was removed is 4.73 ± 3.76 cm along with the maximum myoma diameter was 16 cm.

In some studies, researchers have shown that interventions such as oxytocin infusion, tourniquet application, bilateral uterine artery ligation, and removal of myomas with electrocautery reduce the amount of perioperative bleeding (18-20). All of the patients who underwent myomectomy during cesarean delivery received 30 units of oxytocin infusion during cesarean delivery and 30 units of oxytocin infusion for 24 hours after cesarean delivery in the present study. Additional uterotonic doses were made in cases where needed, too. In some cases, bleeding during the operation was tried to be reduced by surgical interventions such as bilateral uterine artery ligation, tourniquet method, and coagulation with electrocautery in our study. Fortunately, there was no need for hysterectomy during the study period.

In a cohort study Roman et al. reported that there was no significant difference between preoperative and postoperative Hb-Htc change, operation time, and length of hospital stay in patients with and without myomectomy during C/S (21). In addition, no hysterectomy was required in any patient in this case series. In our study, no significant difference was found between Hb-Htc change and length of hospital stay between the groups. However, the operation time was significantly higher in the group of myomectomies. The results of the study conducted by Li et al, who have large-scale series so far, which are similar to the results we have achieved, did not encounter any complications. Additionally, they found the higher operation time in the myomectomy group. They thought that all myomas encountered during cesarean could be removed irrespective of the size and localization of the myoma and this procedure could positively affect the subsequent pregnancy results (22).

As this was a retrospective cohort study, the inability to follow-up obstetric outcomes after myomectomy is the main limitation of our study. To clarify the efficacy and safety of cesarean myomectomy, large-scale randomized controlled studies and studies explaining the mid-term and long-term outcomes (subsequent pregnancy outcome, recurrence of the myoma) of the cesarean myomectomy are needed.

Conclusion

Cesarean myomectomy can be safe and useful procedure in selected cases at the time of the C/S when it is performed by experienced surgeons in well-trained centers. However, the number, size and locations of the myoma are still remains the main challenging points to avoid perioperative and early postoperative complications during cesarean operation.

Conflict of interests

There is no conflict of interest to declare for this manuscript.

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